Appendix A

PAS Subsystem Interface Test Procedure

Date of Test: 9/19/2013

Time of Test: 8:06 AM

Names of personnel present during testing:

Daniel R. Oldham

Ted Wright

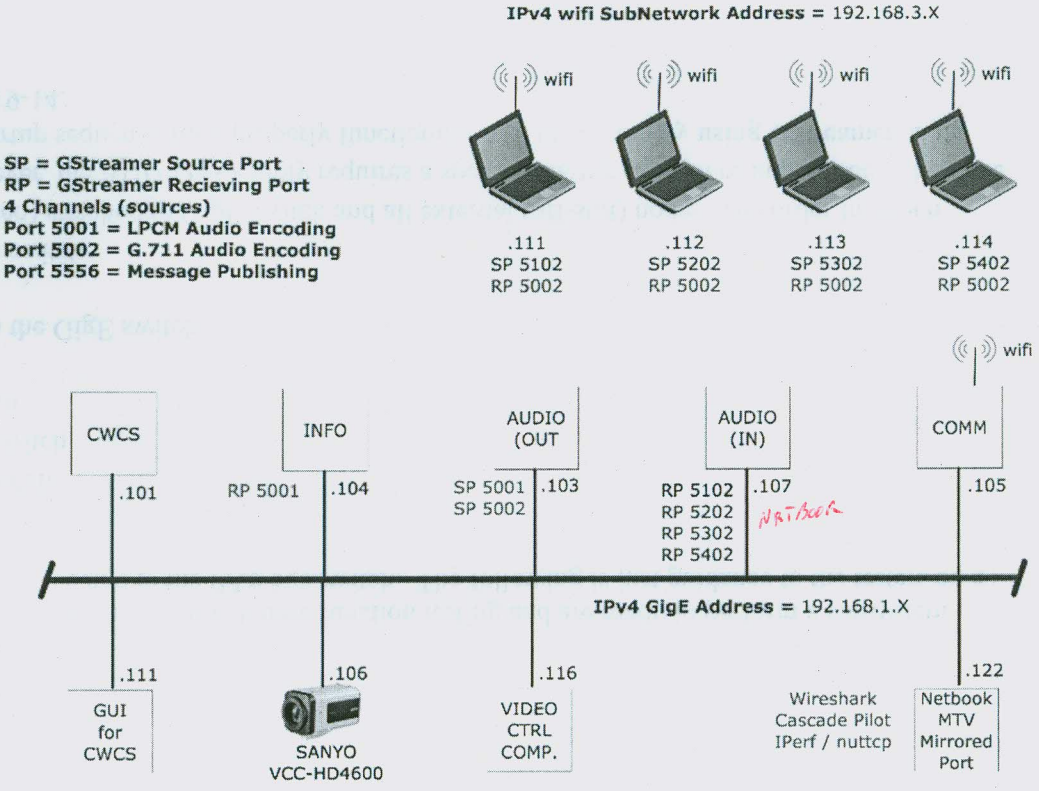
Will Ivancic

Martin Bradish

Joseph M. Kleiball

Scott Sowada

Capt Bibb



Architecture Lead:

Martin Bradish

PAS Subsystem Interface Test Procedure

This test assesses the PAS subsystems ability to communicate between the PAS assemblies using the common bus. For the most part all the test can be run individually, but it is recommended that the "Test setup and Power-on Sequence" and the "Network Connectivity Testing" be run first before any other tests are run to insure proper setup and powering on of the subsystem. Also, it is best to run the "IPerf Stress Testing" last in any test sequence to avoid have to power cycle the assemblies.

Test setup and Power-on Sequence

The main assumptions for this testing are that each of the assemblies have passed there function testing and are ready to perform a subsystem interface test and that the assemblies are powered on and are connected to the PAS bus switch. The following is just guidance to the testers on a preferred connection and power-on sequence.

1. Connect inbound audio assembly to the GigE switch
2. Connect outbound audio assembly to the GigE switch
3. Connect Informatics assembly to the GigE switch
4. Connect CWCS assembly to the GigE switch
5. Connect Monitor, Test and Validation system to the GigE switch
6. Connect Video assembly to the GigE switch
7. Connect Communications assembly to the GigE switch
8. Power on all PAS nodes assemblies (except Video) attached to GigE switch and all external (off-suit) nodes. The order in which systems are powered-on is not important. However, the AUDIO assembly requires a specific startup procedure in part due to how the GStreamer software functions. The required startup sequence for a properly functioning AUDIO assembly using GStreamer as the underlying AUDIO application is given in steps 9-14.
9. Node 3.111 (radio node):
    a. log-on CogNet1
    b. Start terminal window: ./demo2/Linux/demo2node +ro +ti 5102
10. Node 3.112 (radio node):
    a. log-on CogNet2
    b. Start Diskutility and mount 4GB disk.
    c. Start terminal window: /media/4GB/root2/demo2/Linux/demo2node +ro +ti 5202
11. Node 3.113 (radio node):

   a. log-on paspc113
   b. Start terminal window: ./demo2/Linux/demo2node +ro +ti 5302
12. Node 3.114 (radio node):
   a. log-on CogNet4
   b. Start terminal window: ./demo2/Linux/demo2node +ro +ti 5402
13. Node 3.103 (outbound audio):
   a. start Minicom on Node115
   b. turn on board
   c. log-on root
   d. ./demo2/demo2out/demo2out +to
14. Node 3.115 (inbound audio):
   a. log-on paspc102:
   b. Start terminal window: ./demo2/demo2/demo2 +ri
15. Power on Comm
16. Power on Informatics
17. Power on CWCS
18. Power on MTV into Windows OS.

Network Connectivity Testing

1. **Test Description:** This test should be the first test performed. It is a basic connectivity test to ensure all assemblies and other test or monitoring systems are communicating with one another on the bus. As such, this tests the PAS subsystem's ability to properly route messages to check the COMM routing and ARP tables to ensure correctness as this is the gateway for all subsystems to communicate off-suit. (Need to ssh to 192.168.1.105, password?). USER = ROOT PS = root

Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence". Check the routing table in COMM to ensure correctness. This is the gateway for all assemblies to communicate off-suit. 1. Give the test script approximately 40sec to run.

Procedure	Pass	Fail
1. Start Wireshark capture. 2. From node 3.111 run test scrip to ping all nodes (./test1.sh>test1.txt) 3. Once the script is finished display results. (cat test1.txt) a. Did all nodes respond correctly?	✓	
4. From node 3.112 run test scrip to ping all nodes (./test1.sh>test1.txt) 5. Once the script is finished display results. (cat test1.txt) a. Did all nodes respond correctly?	✓	
6. From node 3.113 run test scrip to ping all nodes (./test1.sh>test1.txt) 7. Once the script is finished display results. (cat test1.txt) a. Did all nodes respond correctly?	✓	
8. From node 3.114 run test scrip to ping all nodes (./test1.sh>test1.txt) 9. Once the script is finished display results. (cat test1.txt) a. Did all nodes respond correctly?	✓	
10. From node 1.103 run test scrip to ping all nodes (./test1.sh>test1.txt) 11. Once the script is finished display results. (cat test1.txt)	✓	

a. Did all nodes respond correctly?		
12. From node 1.107 run test scrip to ping all nodes (./test1.sh>test1.txt) 13. Once the script is finished display results. (cat test1.txt) a. Did all nodes respond correctly?	✓	
14. Stop Wireshark capture and save the file. a. Log the file name (TEST1-09192018 all same under PSP13 Folder.	✓	

*Note: Perform network checks as needed beyond the required network checks above. This test will be exhaustive in any final version of a PAS test procedure and is recommended to be an automated.

Network Time Protocol Testing

Test Description: This test shows the ability of COMM to distribute time to the PAS subsystems.

Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence". All network time protocol (NTP) clients should be configured to use COMM as the NTP server. This is accomplished by adding the line "server 192.168.1.105 iburst" to the NTP configuration file. All other "server" lines should be commented out.

- COMM will revert back to Jan. 1, 2000 after each reboot
- NTP may not allow for large jump in the system clock. It may be necessary for the NTP client to force a time sync after/during boot before these tests can be run. This can be accomplished by shutting down the NTP service on the client device, running "ntpdate –bv 192.168.1.105", and then restarting the NTP service.

Procedure	Pass	Fail
1. Startup NTP server on COMM (this should start automatically upon bootup) 2. Start a new Wireshark capture on the MTV machine (port mirror).	✓	
3. Change the time and date in upper-level NTP server (be it COMM or the external source) a. Is Date/Time updated?	✓	

1. From node 3.111 run test scrip (./test2.sh) 2. Once the script is finished display results. (cat test1.txt) a. Did node respond correctly?	✓	
3. From node 3.112 run test scrip (./test2.sh) 4. Once the script is finished display results. (cat test1.txt) a. Did node respond correctly?	✓	
5. From node 3.113 run test scrip (./test2.sh) 6. Once the script is finished display results. (cat test1.txt) a. Did node respond correctly?	✓	
7. From node 3.114 run test scrip (./test2.sh) 8. Once the script is finished display results. (cat test1.txt) a. Did node respond correctly?	✓	
9. From node 1.101 manually update the time and date. a. Did node respond correctly?	✓	
10. From node 1.103 run test scrip (./test2.sh) 11. Once the script is finished display results. (cat test1.txt) a. Did node respond correctly?	✓	✓ DRO
12. From node 1.104 manually update the time and date. a. Did node respond correctly?	✓	
13. From node 1.107 run test scrip (./test2.sh) 14. Once the script is finished display results. (cat test1.txt) a. Did node respond correctly?	✓	
15. Verify that the NTP clients have synchronized with COMM.	✓	
16. Note in the NTP server Log how long it took assemblies to synchronize and how well they synchronized. a. Take a screen capture of the log files and save. b. Record the file name 8.1 src. to Jump To correct time.		
17. Stop Wireshark and save the trace files a. Record the file name test2.1-09192013.	✓	

- Will pinged assembly on PAS was with round trip of 0.3 ms. And then radio round trip was 1.3 ms.

Assembly Status Testing

Test Description: This test checks that each assembly is updating the Informatics assembly with their health and status telemetry.
Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence". Run script Test 3 on all offgoing Nodes & 1,103 & 1,107

Procedure	Pass	Fail
1. From the informatics Comm screen a. Is the Informatics block colored green?	✓	
2. From the informatics Comm screen a. Is the Audio block colored green?	✓	
3. From the informatics Comm screen a. Is the Radio block colored green?		
4. From the informatics Comm screen a. Is the CWCS block colored green?	✓	

Other Telemetry Testing

Test Description: This test checks that the CWCS system is sending consumable telemetry.
Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence".

Consumables

Procedure	Pass	Fail
5. Start Wireshark capture. 6. From the informatics screen is PO2 being decremented?	✓	
7. From the informatics screen is S02 being decremented?	✓	
8. From the informatics screen is Batt being decremented?	✓	
9. From the informatics screen is H2O being decremented?	✓	

Physiological

Procedure	Pass	Fail
1. From the Informatics O2 page is the metabolic rate being updated?	✓	
2. From the Informatics O2 page is the heart rate being updated?	✓	

Basics

Procedure	Pass	Fail
1. Navigate to the Informatics O2 page a. Is the EVA time being updated?	✓	
2. At the CWCS GUI adjust the suit pressure. Δ from 12 to 13 psia a. Is the Suit Pressure being updated?	✓	
3. From the Informatics H2O page, a. Is the Feed Water Pressure at it set pressure?	✓	

b. Is the Water Temperature at it set pressure?	✓	
4. From the Informatics H2O page, a. Is the Battery Voltage at it set pressure?	✓	
b. Is the Battery Current at it set pressure?	✓	

All messages were verified by capture.

CWCS Two Line Display

Procedure	Pass	Fail
1. From the Informatics C&W page view the CWCS two line display mirrored image. a. Is the display being updated?	✓	

wireshark = ~~test 2 telemetry - pcapng~~
test 2 telemetry - 09192013.pcapng

Streaming Audio to Off-suit Nodes Testing

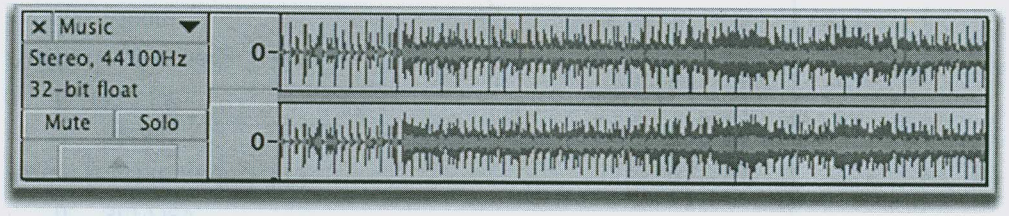
Test Description: This test will demonstrate movement of compressed streaming audio off the suit through the COMM assembly. Use of G.711 for encoding/decoding of voice streams from radio nodes can be verified by code inspection. Wireshark packet captures and audio reception and the output is fed to the network monitoring software package. Note: be sure to boot the MTV notebook into Windows OS.

Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence". Have ready a microphone and speaker set where needed.

Procedure	Pass	Fail
1. From CWCS set the suit pressure to 10 psia. ✓ 2. Start a new Wireshark capture on the MTV machine (port mirror). 3. Produce sound from Audio (Out) assembly. a. Was audio heard from each of the off-suit nodes (3.111 – 3.114)?	✓	
4. Stop capture and save file a. Record the file name test 3 - 09192013.pcapng	✓	

Streaming Audio Latency Testing

Test Description: This test uses Audacity. Audacity is a free, easy-to-use, multi-track audio editor and recorder for Windows, Mac OS X, GNU/Linux and other operating systems. The test uses two microphones connected to Audacity. One records on track 1 (left) and the other on track 2 (right). The measurement occurs between the two tracks. An example of two tracks is shown in the figure below:



Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence". Connect the two microphones to the Monitor, Test and Validation (MTV) system, start and setup Audacity. Place the two microphones a meter or more apart.

Procedure	Pass	Fail
1. Start the recording of Audio from Audacity 2. Next to one microphone make a click sound loud enough to be heard through both microphones. 3. Stop recording and observe the audio latency from Audacity. (difference should be approximately 2-3ms). a. Record the latency (_____). Is it within limit? 4. Clear recording.		
6. Place one microphone by the Audio (Out) assembly next to its microphone input. 7. Place the second microphone next to the Audio (In) assembly's speakers. 8. Start recording and make a click sound next to the Audio (Out) assembly's microphone.		

9. Stop recording and observe the audio latency. Repeat six times and record the mean and standard deviation. a. Record the mean latency (_____). b. Record the standard deviation (_____).		
5. Save the file to a unique name (ex. Test5.wav) a. Log the file name. b.		
6. Document the Gstreamer buffer settings. a.		
7. Repeat steps 6-10 for each of the off-suit nodes. Calculate the mean and standard deviation of the audio time delays. The Audiacity recording does not need archived. a. Audio (out) to node 3.111 i. Mean: _____ ii. Std Dev: _____ b. Audio (out) to node 3.112 i. Mean: _____ ii. Std Dev: _____ c. Audio (out) to node 3.113 i. Mean: _____ ii. Std Dev: _____ d. Audio (out) to node 3.114 i. Mean: _____ ii. Std Dev: _____		
8. Run test setup script (./test5.sh) on nodes 3.111-3.114, 1.107 & 1.103. 9. Use the following tables to fill in data from the Latency tests.		

Latency Measurement from off-suit node 3.113 to PAS node 1.107 (~~In~~ Round) NRT Book

Jitter Buffer Size (ms)	~~Jitter~~ Block Size (Bytes)		
	160	320	640
50	287 started good then stopped ~~good~~	235 ~~Good~~ Broke ~~then Stopped~~.	303 Bad Breaking up
100	262 STOPPED.	353	311
200	416 ~~good~~	385.	425

50/160 - Audio started good then broke up then stopped.

50/320 - 1,107 needed to be re-started sounds fine but then seems to break up. over 1 min → 3 min

test 5 audio in bound dropouts

200/160 - Audio good for 5 min ~~Stop~~ Test. Ended

200/320 - Audio good for 5 min Then stopped.

200/640 - same.

1,103

Latency Measurement from PAS node ~~1.107~~ 3 to off-suit node 3.113 (out round)

Jitter Buffer Size (ms)	~~Jitter~~ Block Size (Bytes)		
	160	320	640
50	425 Breaking up.	309 good:	327.
100	378 Bad, Breaking up.	345	347
200	479 Bit choppy	462	463 ~~462~~

100/640 - Audio was good for about 5 min then Broke up.

* Testing Report: 500/4096 - for inbound & outbound. LATency (OUT) = ~~817~~ 817 test went over 15 min. ended test.

LATency (IN) = 909

* NRW Test: 500/320 — LATency (OUT) = 750, LATency (IN) = 672 } → Failed Burn-in test after 1 hour

* NRW Test: 200/2560

Latency Measurement from PAS node 1.107 to off-suit nodes

200/2560				

402

551

Radio → PA2

Blocksize (Bytes)

JB Size (ms)	320 → 1280 (160ms)	2560 (320ms)	4096 (640 ms)
20	283 BU	417 BVB	502 BUB + echo
200	459 Good	480 Good	536 Good
500	736 Good	/	909 /

200ms JB
40
80
160 / 320ms
240
320 Hans
6/6
640 80ms
560
Good
1,103 3,113

PAS → Radio Blocksize (Bytes)

JB Size (ms)	1280 160ms	2560 320	4096 640
20	366 Good	450 Good	538 Good
200	427 Good / overdrive	571 Good	545 Good
500	762 Good	/	817 /

BS / JB
160 / 100
402 BOP 244

500/1280

mbradish

(ms)	JB	200	100	100	100
(samples)	BS	240	240	280	320
PAS → Radio		Not Bad	Not Bad	Not Bad	377 Good
Radio → PAS		Good	Good	Good	Good 347

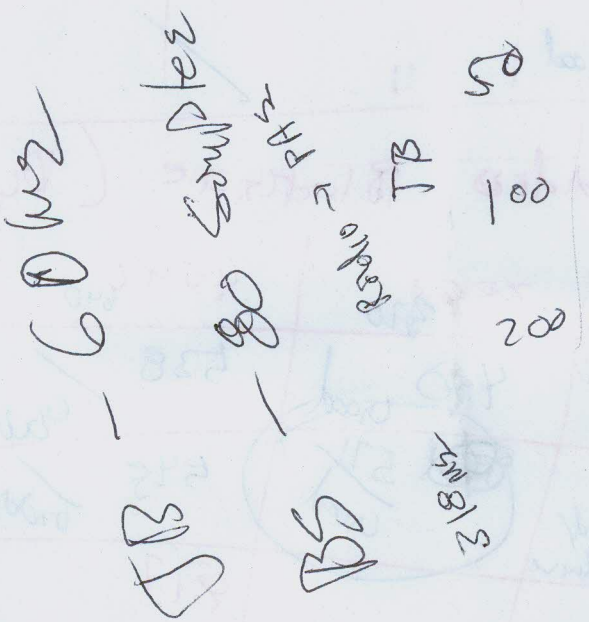
320 samples / 8000 Sam. 40ms

\\GRGRFIL07\86PC216

Block size

160 320 640

50 ~~10~~



Radio → PAS

Blocksize (samples)

JB Size (ms)	160	320	640
50	302 Good	302 G	311 G
100	330 G	335 G	
200	429 G		

PAS → Radio

Blocksize (samples)

JB Size (ms)	160	320	640
50	340 BU	274 G	328 G
100	338 BUB	356 G	
200	286 BUB		

Two-3 round trips

1.3

Blocksize 4096 Bytes

JB Size 500 ms

Radio → PAS

→	111	112	113	114
m1	75 ~~917~~	837	853	~~898~~
m2	73 ~~915~~	822	854	~~897~~
m3	725 ~~916~~	817	859	955
m4	729 ~~914~~	819	853	949
m5	729 ~~914~~	819	836	952
m6	729 ~~914~~	792	816	980

PAS → Radio

	111	112	113	114
m1	872	837	845	837
m2	831	837	849	814
m3	830	862	875	848
m4	829	861	873	856
m5	829	864	842	853
m6	808	856	841	851

Latency Measurement from the off-suit nodes to the PAS nodes

Radio → PAS

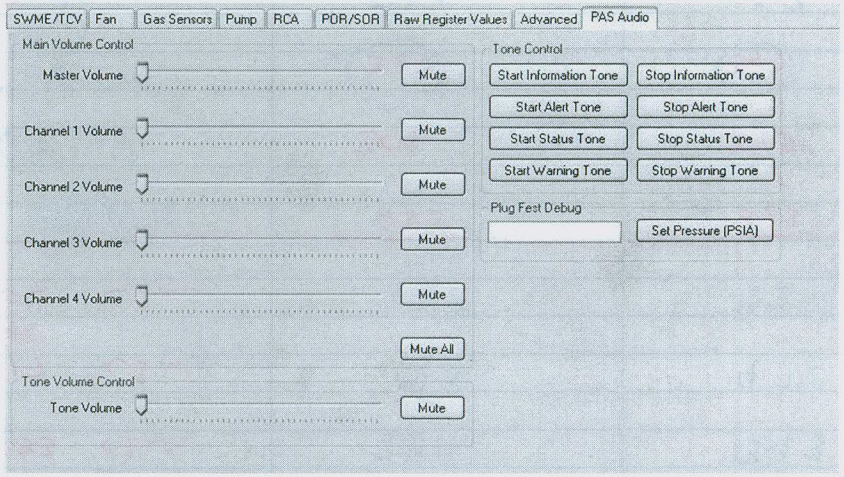
Block Size	20	50	100	200	500
160	268,279	281	262	416	753
320	247	235	353	385	743
640	238	303	311	425	748
1280	283 <1min	290	393	459	736
2560	417 <1min	418	470	480	905
4096	502 <1min	488	420	536	909
160	537, ~~561~~/570	425	328	479	890
320	565 ?	309	345	462	731
640	542 ?	327	347	463	764
1280	366 <1min	568	363	427	762
2560	450 <1min	558	488	571	776
4096	588 <1min	606	653	545	917

PAS → Radio

Inbound Audio Stream Mixing Test

Test Description: For this test the CWCS-GUI will be used to generate various EVENT_PLAY_AUDIO messages from CWCS to AUDIO. The GUI is show in the figure below. Note, "Master Volume" belongs to AUDIO, not CWCS and thus, will not be exercised here.
Validation is via Audio perception, Wireshark packet capture and telemetry observation on Informatics display.

Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence". Setup and source an audio stream from each of the off-suit nodes (3.111 through 3.114) with a destination to the inbound Audio assembly (node 1.107). Also, ensure the suit pressure is set to 10 psia.



Procedure	Pass	Fail
1. Run test setup script (./test6.sh) on nodes 3.111-3.114 & 1.107. 2. Start Wireshark capture. 3. From the CWCS GUI mute all four inbound channels. 4. Unmute channel 1 a. Did channel 1 unmute?	✓	
5. From the GUI adjust channel 1 volume to max. a. Did channel 1 respond correctly?	✓	

6. From the GUI, mute channel 1.		
7. Repeat steps 3-5 for the remaining audio channels. a. Did channel 2 unmute? b. Did channel 2 respond correctly?	✓	
8. Repeat steps 3-5 for the remaining audio channels. a. Did channel 3 unmute? b. Did channel 3 respond correctly?	✓	
9. Repeat steps 3-5 for the remaining audio channels. a. Did channel 4 unmute? b. Did channel 4 respond correctly?	✓	
10. Save the Wireshark file. a. Log the file name (test6-0920 2013)	✓	

Audio Tones Testing

Test Description: This test tests the ability to start and stop tone playing and the ability to stop the tone when acknowledged.
Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence". Set volume tone level to midrange and the suit pressure to 10 psia. Also, ensure that all inbound audio streams are muted.

Test Tone Volume and Starting and Stopping of Tones:

Procedure	Pass	Fail
1. Run test setup script (./test7.sh) on nodes 3.111-3.114 & 1.107. 2. Start Wireshark capture. 3. Place a sound pressure meter 1 meter from the Audio (in) speakers. 4. From the CWCS GUI generate a ~~Warning~~ tone. STATUS TONE 5. From CWCS GUI, adjust the tone volume of 73 dBA (approx. 13 dB above in-suit noise level)		

START capture After #5.

a. Record the speaker volume (73.2)		
4. From CWCS GUI, send an Information tone. a. Did tone sound correctly and last for 30s?	✓	
5. Start Information Tone then depress Stop Information Tone. a. Did Information tone stop?	✓	
6. From CWCS GUI, send a Status tone. a. Did tone sound correctly and last for 5s?	✓	
7. Start Status Tone then depress Stop Status Tone. a. Did Status tone stop?	✓	
8. From CWCS GUI, send an Alert tone. a. Did tone sound correctly and last for 0.5s?	✓	
9. Start Alert Tone then depress Stop Alert Tone. a. Did Alert tone stop? This can be verified by stop message being sent. ✓Notified by message.	✓	
10. From CWCS GUI, send a Warning tone. a. Did tone sound correctly and last for 5min?		✓
11. Start Warning Tone then depress Stop Warning Tone. a. Did Warning tone stop?	✓	
12. Save the Wireshark file. a. Log the file name (test 7q - 09202013.pcapng)	✓	

Warning tone seem to alerts to slow down. 3.5 min we hear Varsity Beeper. 4 min tone stopped playing. Picture died.

Test Tone Priority:

Procedure	Pass	Fail
1. Start Wireshark capture. 2. From CWCS GUI, send an Information tone. a. Did Information tone sound?	✓	
3. While Information tone is sounding start a Status tone. a. Did Information tone stop and Status tone sound?	✓	
4. From CWCS GUI, send a Status tone and while Status tone is sounding start an Alert tone.	✓	

a. Did Status tone stop and Alert tone sound?	✓	
5. From CWCS GUI, send an Alert tone and while Alert tone is sounding start a Warning tone. a. Did Alert tone stop and Warning tone sound? This may be verified by monitoring message traffic.	✓	
6. While the Warning tone is sounding try and start an Alert, Status and Information tone. a. Did Warning tone keep sounding?	✓	
7. While the Alert tone is sounding try and start a Status and Information tone. a. Did Alert tone keep sounding?	✓	
8. While the Status tone is sounding try and start an Information tone. 9. Did Status tone keep sounding?	✓	
10. Save the Wireshark file. a. Log the file name (test7priority-09202013.pcapng		

Test Tone not Adjusted by Master Volume Test:

Procedure	Pass	Fail
1. From CWCS GUI, start a Warning tone. While a Warning tone is sounding adjust the Master volume from the Audio assembly. a. Did the tone volume stay the same volume while the master volume changed?	✓	

test7mastertone-09202013.pcapng

Audio Outbound Pressure Testing

Test Description: This test tests the ability of the PAS subsystem to respond to changes in suit pressure (more specifically to send messages and change audio gains).
Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence". Set volume tone level to midrange and the suit pressure to 10 psia.

Procedure	Pass	Fail
1. Place a Audio (out) microphone in to the microphone calibrator. 2. From the CWCS GUI set the pressure level to 3 psia. 3. Turn on the microphone calibrator. 4. From the Radio or Informatics node, measure the sound pressure level in 3 dB level increments. Log the each measurement below. a. 0 psia = (96.1 dB) b. 3 psia = (~~89.4~~ 94.5 dB) c. 9 psia = (84.6 dB) d. 12 psia = (80.4 dB) e. 15 psia = (76.2 dB) f. 18 psia = (72.2 dB) g. 21 psia = (68.4 dB) h. 24 psia = (67.0 dB) i. 27 psia = (64.1 dB)	✓	

* Vol set to max

6psia = 89.6 dB

*Note: Analyze data to demonstrate appropriate pressure compensation function. Signal should be maximum at ~~3 PSI~~ 0psi and approximately 15 dB ~~higher~~ lower at 15 PSI with a linear progression (in dB) of signal level over full range of suit pressure levels.

Transmit Mode Function Testing

Test Description: This test tests the ability of the PAS subsystem to respond to transmit mode changes.
Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence".

Procedure	Pass	Fail
1. Run test setup script (./test9.sh) on nodes 3.111-3.114 & 1.107. 2. Start Wireshark capture. 3. Set mode to Open-Mic. 4. Set up audio from Audio (out) to Off-suit node 3.111 5. Press the PPT button. a. Is audio still sounding at 3.111? PTT should not have an effect in this mode.	✓	
6. Set mode to PTT a. Did the audio stop playing at node 3.111?	✓	
7. While in the PTT mode, press the PTT button. a. Is audio heard at node 3.111?	✓	
8. Set mode to VOX a. Did the audio stop playing at node 3.111?		✓ not implemented.
9. Speak into the AUDIO (Out) microphone. a. Was your speech heard at node 3.111?	✓	
10. Generate a TBD spl tone at the AUDIO (Out) microphone. Increase the tone level until audio starts sounding at the 3.111 node. a. Record the tone level (_____dBA) test 9-0920 2013.pcapng	MAY3	

Video Stress Testing

Test Description: This test is being performed to add a video stream onto the subsystem bus tests the ability of the PAS subsystem to respond to transmit mode changes.
Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence".

Do we start audio streams with this test?

Procedure	Pass	Fail
1. Start Wireshark capture.	✓	
2. If not already running, use Work Station 192.168.1.106 to open a TCP/IP connection with the camera by entering the URL http://192.168.1.116 using the Internet Explorer Web Browser. a. If prompted for login, use "admin" for username and password. 3. Select "Client Settings" and verify the following: a. Live Stream: STREAM 1 b. H.264 Streaming Protocol: HTTP (INTERNET) 4. Navigate Sanyo camera "Menu" system to modify following parameters as needed for the Video Stream: a. Recording: OFF b. Codec: H.264 c. Resolution: ~~640 x 480~~ (640 x 360) d. Digital PTZ: OFF e. GOP: 30 f. Frame Rate: 30 fps g. Priority: BIT RATE h. Bit Rate: 560 kbps	✓	

*Note: The user must hit the "Set" button under the video stream menu to initiate parameter changes. The camera will require 30 to 60 sec. for reconfiguration and reconnection.	✓	
5. Move camera field of view randomly to simulate image content were mounted on a suit. Observe displayed video for image artifacts. a. Is the video void of motion and image artifacts working correctly i. From Wireshark record bit rate (_____) *(Note: Maximum data rates will be require the highest Resolution (1920 x 1080) , and maximum frame rate (30fps)	← No Artifacts noted. ✓	
6. Increment the bit rate to 1 Mbps. a. Is the video void of motion and image artifacts working correctly b. From Wireshark record bit rate (_____)	← no Artifacts noted ✓	
7. Increment the bit rate to ~~2 Mbps~~. 4Mbps a. Is the video void of motion and image artifacts working correctly b. From Wireshark record bit rate (_____)	← no Artifacts noted. ✓	- change Res 1920 x 1080
8. Increment the bit rate to 5 Mbps. a. Is the video void of motion and image artifacts working correctly b. From Wireshark record bit rate (_____)	← no Artifacts Noted. —	← Res 1920 x 1080
9. Increment the bit rate to ~~10 Mbps~~. 8Mbps a. Is the video void of motion and image artifacts working correctly From Wireshark record bit rate (_____)	← no Artifacts noted. ✓	← 1920 x 1080
10. Increment the bit rate to 20 Mbps. a. Is the video void of motion and image artifacts working correctly 11. From Wireshark record bit rate (_____)		could not go to 20mbps
12. If test at 20 mbps passes, use camera Menu system to create a 2nd video	✓	

stream with the following parameters: a. Recording: OFF b. Codec: H.264 c. Resolution: ~~640 x 480~~ 320x180 d. Digital PTZ: OFF e. GOP: 30 f. Frame Rate: ~~30 fps~~ 5 ips g. Priority: BIT RATE h. Bit Rate: ~~560 kbps~~ 250 KBPS. 13. Connect another node of the PAS breadboard to display the second video stream using steps similar to Steps 2 and 3 above, only specify the Live Steam as STREAM 2. 14. Observe both streams for image artifacts while randomly moving the camera FOV.	✓	. could not figure out how To view Two videos at one time.
15. If this test passes go to the work station and change the setting of the stream from Unicast to a Multicast stream. a. Log how the subsystem responded.	✓	
16. Save the Wireshark file. a. Log the file name (_____)	✓	

* Took different wireshark captures for each setting.
test-video-ucast-560.pcapng
1000
4000
8000
8000-250

-mcast-8000-250

Set client from HTTP to multicast (puts video on all switch ports)
Audio still working

IPerf Stress Testing

Test Description: This test is being performed to ??

Test Setup: Ensure that all subsystem assemblies and associated equipment is powered and connected to the switch as outlined at the beginning of this test procedure under "Test setup and power-on Sequence".

→ = one direction
↔ = Two direction.

Procedure	Pass	Fail
1. Connect a Linux-based PC to the PAS bus as 192.168.1.25 and configure it as an IPerf UDP server. a. Is PC visible on the network?	✓	
17. Using an available notebook connected to the network, perform IPerf test. 1. Enter the command "iperf –u –r –c 192.168.1.25 –t 60 –b 10M" a. Record client response (_____) b. Record server response (9.94 mbps , 1.27ms.) no packet loss	✓	
18. Enter the command "iperf –u –r –c 192.168.1.25 –t 60 –b 15M" a. Record client response (_____) b. Record server response (14.8 MB/s 0.414ms) 0.015%	✓	
19. Enter the command "iperf –u –r –c 192.168.1.25 –t 60 –b 20M" a. Record client response (_____) b. Record server response (19.7 mbps , 0.06ms no Packet Loss.	✓	
20. Enter the command "iperf –u –r –c 192.168.1.25 –t 60 –b 30M" a. Record client response (_____) b. Record server response (24.0 Mbps , 1.232ms) no Packet Loss.	✓	
6. Enter the command "iperf –u –d –c 192.168.1.25 –t 60 –b 10M" c. Record client response (4.03 mbps , 2.291ms , 58%) d. Record server response (4.19 mbps , 12.212ms , 5.4%)	✓	
7. Enter the command "iperf –u –d –c 192.168.1.25 –t 60 –b 15M" a. Record client response (_____) b. Record server response (_____)		✓

BIT Rate, Jitter, Packet Loss (%)

Throughput limit now reached.

8. Enter the command "iperf –u –d –c 192.168.1.25 –t 60 –b 20M" a. Record client response (_____) b. Record server response (_____)		✓
9. Enter the command "iperf –u –d –c 192.168.1.25 –t 60 –b 30M" a. Record client response (_____) b. Record server response (_____)		✓

*Note: After some of the higher bandwidth tests, the network interfaces may become locked up. If this occurs, then steps 1-3 will have to be repeated before any more tests can be run.